A REVISION OF THE PSYLLIDAE OF TAIWAN

By

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(With 2 Text Figures)

Our knowledge on the fauna of the Psyllidae, or Chermidae, of Taiwan (Formosa) has made a beginning by the works of the late my elder brother, SHIGERU KUWAYAMA. In his two papers, "Die Psylliden Japans, I–II", published in 1908 and 1910, the late KUWAYAMA (*21*, *22*)[1] described a very great number of genera and species, and enumerated 11 genera and 18 species as occurring in Taiwan, of which 6 genera and 17 species were new to science. In 1910, Prof. C. SASAKI (*34*) recorded on the life-history of his *Trioza camphorae* of camphor-tree and its injuries, and also reported its distribution in the island just referred to. In 1914, Dr. G. ENDERLEIN (*16*) published his "Psyllidologica II", which is consisted of the result of his studies on H. SAUTER's collection from Taiwan. He recognized in this material 6 species belonging to different genera respectively, and erected 3 new genera and 4 new species, of which one genus was regarded to the known species. Prof. D. L. CRAWFORD (*9*) added in 1919 one more species unrecorded to this faunal region, and Mr. R. TAKAHASHI (*36*) added in 1927 also two species hitherto unrecorded. Owing to these works it may now be recognizable 26 species of the jumping plant-lice, or Psyllids, as inhabiting in Taiwan.

To tread in my brother's footsteps, I have regarded this insect family, both in taxonomic and ecological, for several years with great interest. Mr. R. TAKAHASHI has kindly placed at my disposal some specimens of very interesting Psyllids from Taiwan, and I found in this collection one genus and two species new to science and one species hitherto unknown to this fauna, for which I intended to describe in the present paper. On the other hand, our knowledge of the Psyllid-fauna of the Palaeotropics and the South Pacific Islands has gradually been extended during the past twenty years, through the various works of Prof. CRAWFORD (*4–15*), Dr. ENDERLEIN (*16–19*), Prof. UICHANCO (*37*) and others, especially the former professor furnished many valuable contributions. It consequently necessitates a re-examination regarding the known species of Taiwan. In the following lines I wish to make various comments regarding them. Prof. T. SHIRAKI (*35*), Mr. M. MAKI (*26–28*) and the late Mr. I. NITOBE

1) Reference is made by number to the literatures listed at the end of this paper.

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(*31*) touched on some species from the economic point of view, and I also try to refer to their works.

At this time, I wish to express my heartiest thanks to Prof. Dr. S. MATSUMURA for his kind advice and help during the course of the present studies. My sincere thanks are also due to Messrs. R. TAKAHASHI and T. UE for their kind sendings of the material upon which this paper is based.

Familia: **Psyllidæ** LATREILLE

Subfamilia 1: **Pauropsyllinæ** CRAWFORD

Genus 1: ***Leptynoptera*** CRAWFORD

Leptynoptera CRAWFORD, Phil. Jour. Sci., Vol. XV, p. 141, 147 (1919).

1. ***Leptynoptera sulfurea*** CRAWFORD

Leptynoptera sulfurea CRAWFORD, Phil. Jour. Sci., Vol. XV, p. 147, Pl. I-Figs. 5, 6 (1919); UICHANCO, Phil. Jour. Sci., Vol. XVIII, p. 271 (1921).

Leptynoptera sulfurea var. *rubrocincta* UICHANCO, Phil. Jour. Sci., Vol. XVIII, p. 271, Pl. I-Fig. 4, Pl. III-Fig. 20, Pl. IV-Fig. 38, Pl. V-Fig. 48 (1921); TAKAHASHI, Trans. Nat. Hist. Soc. Formosa, Vol. XVII, p. 152 (1927).

Habitat: Karenkô (after TAKAHASHI); Kuraru (31/VIII, 1921, leg. T. ESAKI; 19/XI, 1923, leg. R. TAKAHASHI).

Distribution: Taiwan; Philippines; Moluccas.

Food plant: *Calophyllum Inophyllum* [Guttiferae].

Remarks: L. B. UICHANCO (*37*) separated the Philippine-form as a distinct variety from the original species of Amboina, Moluccas. According to D. L. CRAWFORD (*9*), however, the type of the species is a single and partly mutilated example, and the too simple description by him does not enable me satisfactorily to determine the relation between the Philippinese and Moluccan forms. Until a more precise description of the Moluccan form is made, I shall have to look upon the difference between these two local forms provisionally as might not necessary for separation. Both L. B. UICHANCO (*37*) and R. TAKAHASHI (*36*) observed this insect as a gall-maker on the leaves of *Calophyllum Inophyllum*.

Genus 2: ***Pauropsylla*** RÜBSAAMEN

Pauropsylla RÜBSAAMEN, Ent. Nachricht., Jg. XXV, p. 264 (1899); CRAWFORD, Phil. Jour. Sci., Vol. X, Sec. D, p. 258 (1915); CRAWFORD, Phil. Jour. Sci., Vol. XV, p. 141 (1919).

2. ***Pauropsylla nigra*** CRAWFORD

Pauropsylla nigra CRAWFORD, Phil. Jour. Sci., Vol. XV, p. 142, 143 (1919); RAMAKRISHNA AYYAR, Rec. Ind. Mus., Vol. XXVI, p. 622 (1924).

Habitat: Kagi (26/XI, 1923, leg. M. KATÔ).

Distribution: Taiwan; India.

Food Plant: *Mangifera indica* [Anacardiaceae].

Remarks: This species has hitherto not been recorded as occurring in Taiwan. As far as I am aware, only the unique female type from Bihar, Pusa, India was heretofore known. According to M. KATÔ, this insect attacks the mango-tree.

Genus 3: ***Paurocephala*** CRAWFORD

Paurocephala CRAWFORD, Phil. Jour. Sci., Vol. VIII, Sec. D, p. 298 (1913); CRAWFORD, Phil. Jour. Sci., Vol. XV, p. 141 (1919); CRAWFORD, Ent. News, Vol. XXXI, p. 69 (1920).

Agonoscena ENDERLEIN, Ent. Mitteil., Bd. III, p. 234 (1914).

3. ***Paurocephala bifasciata*** sp. nov.

Body dull chocolate-brown to dull black, with dusky yellow stripes and markings dorsad, dusky yellow ventrad; colour varies among individuals, apparently deepening with age. Head deflexed, with rather long yellowish hairs sparsely; vertex broader than long, deeply concave at the occipital margin, with the posterior ocelli greatly elevated, roundly convex in front, four yellowish stripes being arranged; frons swollen beneath the antennal insersions; labrum very large, globose. Eyes large, rounded, prominent, deep crimson-red. Antennae rather short and filiform, nearly one and a half times as long as the width of the head; basal two dull yellow, the remains whitish, excepting terminal three and the apices of 4th, 5th and 7th joints which are dull chocolate-brown.

Thorax broad, somewhat arched, with yellowish hairs sparsely. Pronotum long, with a few yellowish markings; praescutum long, with a yellowish stripe at the middle and a concolorous broad border along the hind margin; mesoscutum large, with four yellowish stripes and each a concolorous round marking on the both sides; mesoscutellum with two yellowish markings. Metascutum with an erect, conical process of about 0.12 mm. in length dorsad. Legs dull yellowish, excepting the apical joint of tarsi, claws and the apical spines of tibia which are dull chocolate-brown. Fore-wings hyaline, narrowed basally, broadly rounded at the apical margin, about twice as long as broad, pterostigma somewhat opaque; first marginal cell elongate, narrow, about one and a half times as long as pterostigma; second broad; veins dull yellow with dark brownish terminal portions; two broad brownish fasciae from the base of pterostigma to the terminal of Cu_2 and

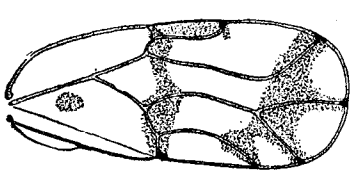

Fig. 1.

Paurocephala bifasciata sp. nov.
Fore-wing, female [×23]

from the terminal of Rs to that of Cu_1, the latter being extended outwardly along the fork of media; besides these fasciae two brownish markings beyond the cubital petiole and near the outside of pterostigma.

Abdomen long; fifth tergite produced caudad, roughly, reticulately marked dorsad. Male genitalia: dull yellowish with concolorous pubescence densely; anal valve simple, much longer than claspers. Female genitalia: basal half dull yellowish, apical half chocolate-brown, with pubescence rather sparsely, flexed sharply downward, rather long; both plates acute at tip, dorsal longer than ventral.

Length of body, ♂, 1.8–2.0 mm., ♀, 2.1–2.3 mm.; length of fore-wing, ♂, 1.7 mm., ♀, 2.0 mm.

Habitat: Taihoku (28/V, 1920, 16/X, 1923, leg. R. TAKAHASHI).

Distribution: Taiwan.

Food Plant: *Ficus Beecheyana* [Moraceae].

Remarks: Described from many specimens, alcoholic co-types, collected by R. TAKAHASHI. This species appears to be very close to *P. psylloptera*, but the markings of fore-wings and other characters justify their separation into a distinct species.

4. *Paurocephala psylloptera* CRAWFORD

Paurocephala psylloptera CRAWFORD, Phil. Jour. Sci., Vol. VIII, Sec. D, p. 294, Fig. 1 (1913); CRAWFORD, Phil. Jour. Sci., Vol. X, Sec. D, p. 260 (1915); CRAWFORD, Phil. Jour. Sci., Vol. XV, p. 148, 149 (1919); CRAWFORD, Ent. News, Vol. XXXI, p. 69 (1920); UICHANCO, Phil. Jour. Sci., Vol. XVIII, p. 276 (1921); CRAWFORD, Rec. Ind. Mus., Vol. XXVI, p. 615 (1924); RAMAKRISHNA, AYYAR, Rec. Ind. Mus., Vol. XXVI, p. 621 (1924).

Agonoscena Sauteri ENDERLEIN, Ent. Mitteil., Bd. III, p. 234, Fig. 2 (1914).

Paurocephala sauteri KUWAYAMA, Jr., Ins. World, Vol. XXVI, p. 368 (1922).

Psylla sp. SHIRAKI, Sp. Rep. Agr. Exp. Sta., Gov. Formosa, No. VIII, p. 135 (1913); MAKI, Rep. Injur. Ins. of Mulberry-tree in Formosa, p. 65, Figs. 7–9, Pl. V (1916).

Habitat: Chipun (after ENDERLEIN); Taihoku (26/X, 1920, 9/X, 1923, leg. R. TAKAHASHI).

Distribution: Taiwan; Philippines; Tenimber Is.; Moluccas; Borneo; Ceylon; S. India.

Food Plant: *Morus* spp. [Moraceae].

Remarks: It would appear to be a widely distributed species in the Asiatic tropics and the South Pacific Islands. *Psylla* sp., which is reported by T. SHIRAKI (*35*) and M. MAKI (*28*) as one of the most serious pests to the mulberry-tree in Taiwan, is apparently identical with *Paurocephala psylloptera*. However, it is noticeable that the mulberry-tree is only known at present as the food-plant in Taiwan, while the hitherto known food-plant in the Philippine Islands is *Ficus ulmifolia* and those in Ceylon are *F. hispida* and *F. asperrima*.

Subfamilia 2: **Carsidarinae** CRAWFORD

Genus 4: ***Togepsylla*** novum

Body somewhat slender; head not cleft in front, nearly as broad as thorax; vertex more or less quadrate, with the anterior ocellus at the front end of head; genae not swollen into cones, wholly covering frons; labrum small; beak with a moderate length; eyes hemispherical; antennae slender, but not longer than the body.

Thorax not arched; legs rather slender; hind coxal spurs very short, hind tibia with a series of spines at apex, and basal tarsus of hind leg with one spine at apex. Fore-wings large, elongate, narrowed basally, rounded apically; pterostigma wanting; both marginal cells very large. Abdomen rather long.

More striking features are apparently two-jointed long setae on head and thorax dorsad and long setae on the margins and veins of the fore-wing.

Type of genus: *Togepsylla takahashii* sp. nov.

The position of this genus is somewhat doubtful, since it resembles the members of the Pauropsyllinae in the character of coxal spur and in some other respects, but differing from this subfamily in a slender body, unarched thorax and in some head characters. From these it is suggestive to let it belong to the Carsidarinae.

5. ***Togepsylla takahashii*** sp. nov.

Head and thorax uniformly pale brownish yellow; abdomen yellowish white, probably greenish in life. Head somewhat quadrate; vertex broader than long, nearly straight at the occipital margin, slightly concave in front, with the frontal ocellus conspicuously elevated. Eyes large, brownish in colour. Between eyes and on the vertex with each a pair of long yellowish brown setae, at the base being approached; the setae about 0.12 mm. in length, the basal part being thick and relatively short and the apical part slender; near to the inner sides of eyes and behind them also located a seta of the same character respectively, the former being about 0.16 mm. in length. Antennae about as long as head and thorax; basal two thick and short, the 3rd longest, being gradually shortened towards the terminal joint; light yellow, excepting terminal two and the apices of the 3rd to 8th, which are brownish.

Thorax rather long; pronotum quadrate, with eight long setae, two long pairs being seen from sides, one on the centre, the remains short and located between the central and lateral setae. Praescutum small, with a pair of setae; metascutum large, with five pairs of setae, the lateral one being the longest; meso-

scutellum with a pair of setae. Legs slender, yellowish, slightly darkened at the apical joint of tarsi. Fore-wings hyaline, elongate, narrowed basally, broadest subapically, broadly rounded at the apical margin, about two and a half times as long as broad, slightly brownish along the light yellowish veins; many curved setae of about 0.16 mm. on the anterior margin and veins, excepting M_{3+4}, Cu_2 and the apical half of Cu_1, as shown in the text figure, the base of setae being brownish; radial sector rather short, curved posteriorly; principal basal vein and cubital petiole short, about equal in length; Cu_2 very short, Cu_1 very long and curved, thus forming a very elongate 1st marginal cell; 2nd marginal cell large.

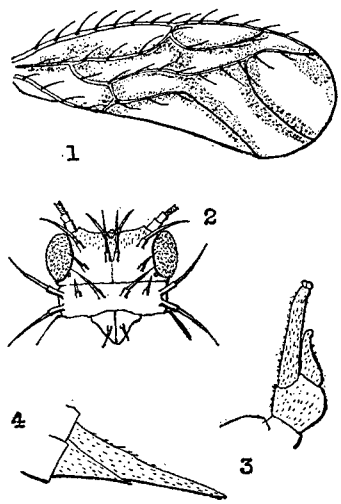

Fig. 2.

Togepsylla takahashii sp. nov.

1. Fore-wing, male [×29]
2. Head and prothorax, dorsal aspect [much enlarged]
3. Male genitalia, lateral aspect [much enlarged]
4. Female genitalia, lateral aspect [much enlarged]

Abdomen long. Male genitalia: anal valve very long and slender, as twice as the claspers, terminated with valvule; claspers provided with a series of dentation on the inner margins. Female genitalia: very long and slender, as long as the rest of abdomen, narrow and acute at the tip, dorsal much longer than ventral.

Length of body, ♂, 1.6–1.8 mm., ♀, 1.6–2.0 mm.; length of fore-wing, ♂, 1.5 mm., ♀, 1.8 mm.

Habitat: Urai (4/I, 1921, leg. R. TAKAHASHI).

Distribution: Taiwan.

Remarks: Described from 3 male and 3 female specimens (alcoholic cotypes). This interesting species is named in honor of the collector, Mr. R. TAKAHASHI, who has done much contribution towards making known the Psyllid-fauna of Taiwan.

Genus 5: ***Dynopsylla*** CRAWFORD

Dynopsylla CRAWFORD, Phil. Jour. Sci., Vol. VIII, Sec. D, p. 295 (1913); CRAWFORD, Phil. Jour. Sci., Vol. XV, p. 156 (1919); ENDERLEIN, Zool. Anz., Bd. LII, p. 119 (1921); CRAWFORD, Rec. Ind. Mus., Vol. XXVI, p. 618 (1924).

Sphingocladia ENDERLEIN, Ent. Mitteil., Bd. III, p. 231 (1914); ENDELEIN, Zool. Jahrb., Bd. XLI, Syst., p. 482, Fig. B. (1918); ENDERLEIN, Ent. Mitteil., Bd. XV, p. 397, 399 (1926).

6. ***Dynopsylla pinnativena*** ENDERLEIN

Sphingocladia pinnativena ENDERLEIN, Ent. Mitteil., Bd. III, p. 231 (1914); ENDERLEIN, Zool.

Jahrb., Bd. XLI, Syst., p. 482, Fig. B (1918).

Dynopsylla pinnativena ENDERLEIN, Zool. Anz., Bd. LII, p. 119 (1921); KUWAYAMA, Jr., Ins. World, Vol. XXVI, p. 368 (1922); CRAWFORD, Rec. Ind. Mus., Vol. XXVI, p. 619 (1924).

Habitat: Taihorinsho (after ENDERLEIN).

Distribution: Taiwan.

Genus 6: ***Mesohomotoma*** KUWAYAMA

Mesohomotoma KUWAYAMA, Trans. Sapporo Nat. Hist. Soc., Vol. II, p. 180 (1908); CRAWFORD, Pomona Coll. Jour. Ent., Vol. III, p. 483 (1911); ENDERLEIN, Zool. Anz., Bd. LII, p. 119 (1921); CRAWFORD, Proc. Hawaii. Ent. Soc., Vol. VI, p. 33 (1925).

Udamostigma ENDERLEIN, Wissensch. Ergeb. d. Schw. Zool. Exped. Kilimandjaro, Deutsch-Ostafrikas, 1905–1906, Hemipt. (Psyllid.), p. 138 (1910).

7. ***Mesohomotoma camphorae*** KUWAYAMA

Mesohomotoma Camphorae KUWAYAMA, Trans. Sapporo Nat. Hist. Soc., Vol. II, p. 181, Pl. III-Figs. 15, 20 (1908); CRAWFORD, Pomona Coll. Jour. Ent., Vol. III, p. 491 (1911); OSHANIN, Katal. Palaearkt. Hemipt., p. 128 (1912); AULMANN, Psyllid. Cat., p. 36 (1913); MATSUMURA, Appl. Ent., Vol. I, p. 373, Pl. XIV-Fig. 5 (1917); MATSUMURA, Manual Injur. Ins. Jap., Vol. I, p. 255, Pl. VIII-Fig. 5 (1920); KUWAYAMA, Jr., Ins. World, Vol. XXVI, p. 368 (1922); CRAWFORD, Proc. Hawaii. Ent. Soc., Vol. VI, p. 33 (1925); CRAWFORD, Ins. Samoa, Pt. II, p. 31 (1927).

Habitat: Horisha (after KUWAYAMA); Tansui (29/X, 1923, leg. R. TAKAHASHI).

Distribution: Taiwan; Ogasawara; Samoan Is.; Fiji Is.

Food Plants: *Hibiscus tiliaceus* [Malvaceae]; *Cinnamomum Camphora* [Lauraceae].

Remarks: The co-type specimens were taken on the camphor-tree, but the specimens before me were taken on the foliage of "Yama-asa" (*Hibiscus tiliaceus*). D. L. CRAWFORD (*15*) also reported that this species in the Fiji Island was found on the foliage of the milo-tree which is somewhat related to *Hibiscus*.

8. ***Mesohomotoma lineaticollis*** ENDERLEIN

Mesohomotoma lineaticollis ENDERLEIN, Ent. Mitteil., Bd. III, p. 232 (1914); KUWAYAMA, Jr., Ins. World, Vol. XXVI, p. 368 (1922); CRAWFORD, Proc. Hawaii. Ent. Soc., Vol. VI, p. 33, 35 (1925); TAKAHASHI, Trans. Nat. Hist. Soc. Formosa, Vol. XVII, p. 152, 4 figs. (1927).

Habitat: Taihorin (after ENDERLEIN); Taihoku (23/IX, 1920, 3/XI, 1923, leg. R. TAKAHASHI), Shirin (27/VI, 1919, leg. R. TAKAHASHI).

Distribution: Taiwan.

Food Plant: *Urena lobata* var. *tomentosa* [Malvaceae].

Remarks: This species is apparently very close to *M. camphorae*, differing only in some minor characters such as the body-colour, venation of the forewing, etc. However, I am not hoping to make any alteration in this work.

Genus 7: ***Homotoma*** GUÉRIN

Homotoma GUÉRIN, Iconogr. d. règn. anim., p. 376 (1844); F. LÖW, Verh. Zool. Bot. Ges. Wien, Vol. XXVIII, p. 607 (1878); CRAWFORD, Pomona Coll. Jour. Ent., Vol. III, p. 483 (1911); CRAWFORD, Phil. Jour. Sci., Vol. X, Sec. D, p. 262 (1915); CRAWFORD, Phil. Jour. Sci., Vol. XV, p. 161 (1919).

Anisostropha FÖRSTER, Verh. d. Naturh. Ver. d. preuss. Rheinl., Vol. III, p. 92 (1848).

Psausia ENDERLEIN, Ent. Mitteil., Vol. III, p. 232 (1914); ENDERLEIN, Zool. Anz., Bd. LII, p. 120 (1921).

ENDERLEIN (*16*) erected the genus *Psausia* adopting *Homotoma radiatum* as the genotype. According to his description and figure, one of the distinct characters is unfurcation of the cubitus. However, the cubitus of the forewing is always furcated in the co-type specimens, as figured by the late KUWAYAMA (*21*), and also in many specimens before me from Kyushu. So far as my studies go, it may be satisfactory to group *Psausia* ENDERLEIN together in *Homotoma* GUÉRIN.

9. ***Homotoma radiatum*** KUWAYAMA

Homotoma radiatum KUWAYAMA, Trans. Sapporo Nat. Hist. Soc., Vol. II. p. 181, Pl. III-Fig. 14 (1908); CRAWFORD, Pomona Coll. Jour. Ent., Vol. III, p. 491 (1911); AULMANN, Psyllid. Cat., p. 36 (1913); CRAWFORD, Phil., Jour. Sci., Vol. XV, p. 162 (1919).

Psausia radiata ENDERLEIN, Ent. Mitteil., Bd. III, p. 232, Fig. 1 (1914); KUWAYAMA, Jr., Ins. World, Vol. XXVI, p. 368 (1922).

Habitat: Horisha (after KUWAYAMA).

Distribution: Taiwan; Kyushu.

Food Plant: *Ficus erecta* [Moraceae].

Remarks: Recently T. UE observed at Yasaka, Province of Bungo, Kyushu, this species on the young shoots of *Ficus erecta*, and kindly sent to me some fine specimens.

Genus 8: ***Tenaphalara*** KUWAYAMA

Tenaphalara KUWAYAMA, Trans. Sapporo Nat. Hist. Soc., Vol. II, p. 155 (1908); CRAWFORD, Pomona Coll. Jour. Ent., Vol. III, p. 483 (1911); CRAWFORD, Phil. Jour. Sci., Vol. XV, p. 163 (1919).

Strogylocephala CRAWFORD, Phil. Jour. Sci., Vol. XII, Sec. D, p. 166 (1917).

10. ***Tenaphalara acutipennis*** KUWAYAMA

Tenaphalara acutipennis KUWAYAMA, Trans. Sapporo Nat. Hist. Soc., Vol. II, p. 156, Pl. III-Figs. 5, 11 a. b (1908); CRAWFORD, Pomona Coll. Jour. Ent., Vol. III, p. 491 (1911); AULMANN, Psyllid. Cat., p. 75 (1913); CRAWFORD, Phil. Jour. Sci., Vol. XV, p. 163, 164 (1919); KUWAYAMA, Jr., Ins. World, Vol, XXVI, p. 368 (1922); RAMAKRISHNA AYYAR, Rec. Ind. Mus., Vol. XXVI, p. 623 (1924).

Tenaphalara elongata CRAWFORD, Rec. Ind. Mus., Vol. VII, p. 432, Pl. XXXIV-Figs. M. N. P. Q, Pl. XXXV-Fig. O (1912).

Habitat: "Formosa" (after KUWAYAMA).

Distribution: Taiwan; Philippines; India.

Remarks: The food plant of this widely distributed species is not yet known in Taiwan. According to D. L. CRAWFORD (*9*), however, it is found on "silk cotton" in India and on *Sterculia foetida* [Sterculiaceae] in the Philippines.

Genus 9: ***Macrohomotoma*** KUWAYAMA

Macrohomotoma KUWAYAMA, Trans. Sapporo Nat. Hist. Soc., Vol. II, p. 179 (1908); CRAWFORD, Pomona Coll. Jour. Ent., Vol. III, p. 483 (1911); ENDERLEIN, Ent. Mitteil., Bd. III, p. 233 (1914); CRAWFORD, Phil. Jour. Sci., Vol. XV, p. 157 (1919); ENDERLEIN, Zool. Anz., Bd. LII, p. 119 (1921); CRAWFORD, Proc. Hawaii. Ent. Soc., Vol. VI, p. 36 (1925).

11. ***Macrohomotoma gladiatum*** KUWAYAMA

Macrohomotoma gladiatum KUWAYAMA, Trans. Sapporo Nat. Hist. Soc., Vol. II, p. 180, Pl. III-Fig. 13 (1908); CRAWFORD, Pomona Coll. Jour. Ent., Vol. III, p. 490 (1911); AULMANN, Psyllid. Cat., p. 36 (1913); ENDERLEIN, Ent. Mitteil., Bd. III, p. 233 (1914); MAKI, Ins. World, Vol. XIX, p. 267 Pls. XIII-XIV (1915); MAKI, Sp. Rep. Forest. Exp. Sta., Gov. Formosa, No. I, p. 37, Pl. VIII-Figs. 5, 6 (1915); KUWAYAMA, Jr., Ins. World, Vol. XXVI, p. 368 (1922); CRAWFORD, Proc. Hawaii. Ent. Soc., Vol. VI, p. 37 (1925).

Habitat: Arisan (after KUWAYAMA), Ako (after MAKI), Tainan (after ENDERLEIN), Kôheki (III, 1921, leg. R. TAKAHASHI).

Distribution: Taiwan.

Food Plant: *Ficus retusa* [Moraceae].

Remarks: According to M. MAKI (*26*, *27*), this species is common in the level ground of Taiwan, being much more in the southern part, and produces malformation on the young shoots of *Ficus retusa*, sometimes causing serious ravages.

Subfamilia 3: **Psyllinae** F. LÖW

Genus 10: ***Diaphorina*** F. LÖW

Diaphora F. LÖW, Verh. Zool. Bot. Ges. Wien, Bd. XXVIII, p. 603 (1878) [nom. praeocc.].

Diaphorina F. LÖW, Verh. Zool. Bot. Ges. Wien, Bd. XXIX, p. 567 (1879); F. LÖW, Verh. Zool. Bot. Ges. Wien, Bd. XXX, p. 257 (1880); CRAWFORD, Rec. Ind. Mus., Vol. XXVI, p. 615 (1924).

12. ***Diaphorina citri*** KUWAYAMA

Diaphorina citri KUWAYAMA, Trans. Sapporo Nat. Hist. Soc., Vol. II, p. 160, Pl. III-Fig. 16

(1908); SHIRAKI, Sp. Rep. Agr. Exp. Sta., Gov. Formosa, No. VIII, p. 132 (1913); AULMANN, Psyllid. Cat., p. 7 (1913); NITOBE, Rep. Injur. Ins. of Citrus-tree, p. 71, 1 fig. (1916); MATSUMURA, Appl. Ent., Vol. I, p. 373, Pl. XIV-Fig. 4 (1917); MATSUMURA, Manual Injur. Ins. Jap., Vol. 1, p. 254, Pl. VIII-Fig. 4 (1920); CRAWFORD, Rec. Ind. Mus., Vol. XXVI, p. 616 (1924); RAMAKRISHNA AYYAR, Rec. Ind. Mus., Vol. XXVI, p. 623 (1924); HUSAIN & NATH, Mem. Dept. Agr. India, Ent. Ser., Vol. X, No. 2, Pls. I–IV, 3 figs. (1927).

Euphalerus citri CRAWFORD, Rec. Ind. Mus., Vol. VII, p. 424, 431, Pl. XXXIII-Figs, N, O, P, Pl. XXXV-Fig. D (1912); CRAWFORD, Phil. Jour. Sci., Vol. VIII, Sec. D, p. 299 (1913); MAKI, Sp. Rep. Forest. Exp. Sta., Gov. Formosa, No. 1, p. 37, Pl. VIII-Figs. 3, 4 (1915); CRAWFORD, Phil. Jour. Sci., Vol. XII, Sec. D, p. 168 (1917); CRAWFORD, Phil. Jour. Sci., Vol. XV, p. 169, 171 (1919); KUWAYAMA, Jr., Engei, Vol. XIII, No. 1, p. 31 (1921); KUWAYAMA, Jr., Ins. World, Vol. XXVI, p. 368 (1922).

Habitat: Shinchiku (after KUWAYAMA), Taihoku (30/IX, 13/VI, 1920, leg. R. TAKAHASHI).

Distribution: Taiwan; Philippines; Moluccas; Java; Malay; S. China; India.

Food Plants: *Citrus* spp., *Murraya paniculata* [Rutaceae].

Remarks: This species is widely distributed and very common throughout the southern portion of the Eastern Hemisphare, and is known as one of the most serious pests to the citrus culture. T. SHIRAKI (*35*) and I. NITOBE (*31*) observed on the ecology of this species in Taiwan, and recently M. A. HUSAIN and D. NATH (*20*) reported on the result of their detailed observations in India. According to T. V. RAMAKRISHNA AYYAR (*32*), this species was found also on the shoots of *Murraya koenigii* in the South India, and this plant is considered as an alternative food-plant. M. MAKI (*27*) also enumerated *M. paniculata* as one of the food-plants in Taiwan. The food-plants of this species are apparently limitted to the Rutaceae.

Genus 11: ***Epipsylla*** KUWAYAMA

Epipsylla KUWAYAMA, Trans. Sapporo Nat. Hist. Soc., Vol. II, p. 178 (1908); CRAWFORD, Phil. Jour. Sci., Vol. XV, p. 168, 177 (1919).

13. *Epipsylla albolineata* KUWAYAMA

Epipsylla albolineata KUWAYAMA, Trans. Sapporo Nat. Hist. Soc., Vol. II, p. 178, Pl. III-Fig. 19 (1908); AULMANN, Psyllid. Cat., p. 7 (1913); CRAWFORD, Phil. Jour. Sci., Vol. XV, p. 177 (1919); KUWAYAMA, Jr., Ins. World, Vol. XXVI, p. 369 (1922).

Habitat: Arisan (after KUWAYAMA); Taihoku (29/V, 1920, leg. R. TAKAHASHI).

Distribution: Taiwan.

Food Plant: *Mucuna subferruginea* [Leguminosae].

Remarks: On sending the specimens, R. TAKAHASHI communicated that this insect occurs on *Mucuna subferruginea* [Leguminosae].

14. *Epipsylla rubrofasciata* KUWAYAMA

Epipsylla rubrofasciata KUWAYAMA, Trans. Sapporo Nat. Hist, Soc., Vol. II, p. 179 (1908); AULMANN, Psyllid. Cat., p. 7 (1913); CRAWFORD, Phil. Jour. Sci., Vol. XV, p. 178 (1919); KUWAYAMA, Jr., Ins. World, Vol. XXVI, p. 369 (1922).

Habitat: Koshun (after KUWAYAMA), Arisan (after KUWAYAMA).

Distribution: Taiwan.

Genus 12: *Metapsylla* KUWAYAMA

Metapsylla KUWAYAMA, Trans. Sapporo Nat. Hist. Soc., Vol. II, p. 157 (1908); CRAWFORD, Phil. Jour. Sci., Vol. XV, p. 169 (1919).

15. *Metapsylla marginata* KUWAYAMA

Metapsylla marginata KUWAYAMA, Trans. Sapporo Nat. Hist. Soc., Vol. II, p. 158 (1908); AULMANN, Psyllid. Cat., p. 7 (1913); KUWAYAMA, Jr., Ins. World, Vol. XXVI, p. 371 (1922).

Habitat: Koshun (after KUWAYAMA).

Distribution: Taiwan.

Genus 13: *Psylla* GEOFFROY

Psylla GEOFFROY, Hist. abr. Ins. envir. Paris, Tom. I, p. 482 (1762); FÖRSTER, Verh. d. naturh. Ver. d. preuss. Rheinl., Vol. III, p. 67 (1848); FLOR, Rhynch. Livl., Bd., II, p. 446 (1861); F. LÖW, Verh. Zool. Bot. Ges. Wien, Vol. XXVIII, p. 600 (1878); FROGGATT, Proc. Linn. Soc. N. S. Wales., 1901, p. 243 (1901); CRAWFORD, U. S. Nat. Mus., Bul. 85, p. 135 (1914); CRAWFORD, Phil. Jcur. Sci., Vol. XV, p. 178 (1919).

16. *Psylla spadica* KUWAYAMA

Psylla spadica KUWAYAMA, Trans. Sapporo Nat. Hist. Soc., Vol. II, p. 165 (1908); AULMANN, Psyllid. Cat., p. 27 (1913); CRAWFORD, Phil. Jour. Sci., Vol. XV, p. 180 (1919); KUWAYAMA, Jr., Ins. World, Vol. XXVI, p. 371 (1922).

Habitat: Arisan (after KUWAYAMA).

Distribution: Taiwan.

17. *Psylla arisana* KUWAYAMA

Psylla arisana KUWAYAMA, Trans. Sapporo Nat. Hist. Soc., Vol. II, p. 168 (1908); AULMANN, Psyllid. Cat., p. 11. (1913); CRAWFORD, Phil. Jour. Sci., Vol. XV, p. 179 (1919); KUWAYAMA, Jr., Ins. World, Vol. XXVI, p. 369 (1922).

Habitat: Arisan (after KUWAYAMA).

Distribution: Taiwan.

18. *Psylla coccinea* KUWAYAMA

Psylla coccinea KUWAYAMA, Trans. Sapporo Nat. Hist. Soc., Vol. II, p. 171 (1908); OSHANIN, Katal. palaearkt. Hemipt., p. 127 (1912); AULMANN, Psyllid. Cat., p. 14 (1913); CRAWFORD, Phil. Jour. Sci., Vol. XV, p. 178 (1919); KUWAYAMA, Jr., Ins. World, Vol. XXVI, p. 369 (1922).

Habitat: "Formosa" (after CRAWFORD).

Distribution: Taiwan; Kyushu, Honshu, Hokkaido.

Food Plant: *Akebia quinata* [Lardizabalaceae].

Remarks: This species is widely distributed throughout Japan proper, and is found on *Akebia quinata*. Unfortunately, I have not yet examined any specimens of this species from Taiwan personally.

19. *Psylla toroensis* KUWAYAMA

Psylla toroensis KUWAYAMA, Trans. Sapporo Nat. Hist. Soc., Vol. II, p. 172 (1908); AULMANN, Psyllid. Cat., p. 28 (1913); CRAWFORD, Phil. Jour. Sci., Vol. XV, p. 180 (1919); KUWAYAMA, Jr., Ins. World, Vol. XXVI, p. 371 (1922).

Habitat: Toroen (after KUWAYAMA).

Distribution: Taiwan.

20. *Psylla kiushuensis* KUWAYAMA

Psylla kiushuensis KUWAYAMA, Trans. Sapporo Nat. Hist. Soc., Vol. II, p. 174 (1908); OSHANIN, Katal. palaearkt. Hemipt., p. 128 (1912); AULMANN, Psyllid. Cat., p. 18 (1913); CRAWFORD, Phil. Jour. Sci., Vol. XV, p. 179 (1919); KUWAYAMA, Jr., Ins. World, Vol. XXVI, p. 370 (1922).

Habitat: "Formosa" (after KUWAYAMA).

Distribution: Taiwan; Kyushu.

21. *Psylla kuwayamai* CRAWFORD

Psylla tripunctata KUWAYAMA, Trans. Sapporo Nat. Hist. Soc., Vol. II, p. 174 (1908) [nom. praeocc.]; AULMANN, Psyllid. Cat., p. 28 (1913); CRAWFORD, Phil. Jour. Sci., Vol. XV, p. 180 (1919); KUWAYAMA, Jr., Ins. World, Vol. XXVI, p. 371 (1922).

Psylla kuwayamai CRAWFORD, Pomona Coll. Jour. Ent., Vol. III, p. 430 (1911); CRAWFORD, Ent. News, Vol. XXXI, p. 70 (1920).

Habitat: "Formosa" (after KUWAYAMA).

Distribution: Taiwan.

Subfamilia 4: **Triozinae** F. LÖW

Genus 14; *Trioza* FÖRSTER

Trioza FÖRSTER, Verh. d. naturh. Ver. d. Preuss. Rheinl., Vol. III, p. 67 (1848); FLOR, Rhynch. Livl., Bd. II, p. 484 (1861); F. LÖW, Verh. Zool. Bot. Ges. Wien, Vol. XXVIII, p. 609 (1878); FROGGATT, Proc. Linn. Soc. N. S. Wales, 1901, p. 273 (1901); CRAWFORD, Pomona Coll. Jour. Ent., Vol. III, p. 423 (1911); CRAWFORD, U. S. Nat. Mus., Bul. 85, p. 74 (1914); CRAWFORD, Phil. Jour. Sci., Vol. XV, p. 185, 186 (1919).

Spanioza ENDERLEIN, Ent. Mitteil., Bd. XV, p. 400 (1926).

22. *Trioza brevifrons* KUWAYAMA

Trioza brevifrons KUWAYAMA, Trans. Sapporo Nat. Hist. Soc., Vol. III, p. 61 (1910); AULMANN, Psyllid. Cat., p. 40 (1913); CRAWFORD, Phil. Jour. Sci., Vol. XV, p. 188 (1919); KUWAYAMA, Jr., Ins. World, Vol. XXVI, p. 372 (1922).

Habitat: "Formosa" (after KUWAYAMA).

Distribution: Taiwan.

23. *Trioza camphorae* SASAKI

Trioza camphorae SASAKI, "First Rep. Injur. Ins. of Camphor-tree, p. 1 (1905)"; SASAKI, Second Rep. Injur. Ins. of Camphor-tree, p. 1 (1907); SASAKI, "Nip. Konch. Kwai Ho, Vol. II, p. 131 (1908)"; SASAKI, Jour. Coll. Agr., Imp. Univ. Tokyo, Vol. II, p. 278, Pls. XV–XVI (1910); AULMANN, Psyllid. Cat., p. 40 (1913); MAKI, Sp. Rep. Forest. Exp. Sta., Gov. Formosa, No. I, p. 36, Pl. VIII-Figs. 1, 2 (1915); KUWAYAMA, Jr., Ins. World, Vol. XXVI, p. 372 (1922).

Kuwayama (Epitrioza) camphorae MATSUMURA, Appl. Ent., Vol. I, p. 374, Pl. XIV-Fig. 7 (1917); MATSUMURA, Manual Injur. Ins. Jap., Vol. I, p. 256, Pl. VIII-Fig. 6 (1920).

Habitat: "Formosa" (after SASAKI).

Distribution: Taiwan; Kyushu, Shikoku, Honshu; S. China.

Food Plant: *Cinnamomum Camphora* [Lauraceae].

Remarks: This species is widely distributed in the southern part of Japan and South China. According to C. SASAKI (*33*, *34*), although the younger as well as the older camphor-trees are liable to be infested by this insect, the injuries are more serious for the younger trees less than ten years old, forming large numbers of oval or roundish galls on the surface of leaves.

24. *Trioza formosana* KUWAYAMA

Trioza formosana KUWAYAMA, Trans. Sapporo Nat. Hist. Soc., Vol. III, p. 58, Pl. II-Fig. 6 (1910); AULMANN, Psyllid. Cat., p. 46 (1913); CRAWFORD, Phil. Jour. Sci., Vol. XV, p. 188 (1919); KUWAYAMA, Jr., Ins. World, Vol. XXVI, p. 372 (1922).

Habitat: "Formosa" (after KUWAYAMA).

Distribution: Taiwan.

25. *Trioza galii* FÖRSTER.

Trioza Galii FÖRSTER, Verh. naturh. Ver. preuss. Rheinl., Vol. III, p. 87 (1848); FLOR, Rhynch. Livl., Bd. II, p. 511 (1861); OSHANIN, Ann. Mus. Zool. Acad. Imp. Sci,, Bd. XII, p. 372 (1907); KUWAYAMA, Trans. Sapporo Nat. Hist. Soc., Vol. III, p. 57 (1910); SULC, Sitzber. d. Kön. böhm. Ges. d. Wiss. Prag, II. Classe, XVII, p. 16, Tab. V (1910); OSHANIN, Katal. palaearkt. Hemipt., p. 129; (1912); CRAWFORD, Phil. Jour. Sci., Vol. XV, p. 188 (1919); KUWAYAMA, Jr., Ins. World, Vol. XXVI, p. 372 (1922).

Spanioza galii ENDERLEIN, Ent. Mitteil., Bd. XV, p. 400 (1926).

Habitat: "Formosa" (after KUWAYAMA).

Distribution: Taiwan; Honshu, Hokkaido; Siberia; Europe; Transcaucasia.

Remarks: This species was described as early as in 1848 by A. FÖRSTER on the specimens which were taken on *Galium verum* [Rubiaceae]. Since that time this species was widely discovered at different quarters and various species of the genus *Galium* were recorded as the food-plants.

26. *Trioza kuwayamai* ENDERLEIN

Trioza Kuwayamai ENDERLEIN, Ent. Mitteil., Bd. III, p. 235, Fig. 3 (1914); KUWAYAMA, Jr., Ins. World, Vol. XXVI, p. 372 (1922).

Spanioza Kuwayamai ENDERLEIN, Ent. Mitteil., Bd. XV, p. 400 (1926).

Habitat: Hoozan (after ENDERLEIN).

Distribution: Taiwan.

Genus 15: *Trichochermes* KIRKALDY

Trichopsylla "THOMSON, Opus. Ent., f. VIII, p. 823 (1877)" [nom. praeocc.].
Trichochermes KIRKALDY, Entomologist, 1904, p. 280 (1904).

This genus was not recognized by D. L. CRAWFORD (*9*) in his paper published in 1919 as distinct from *Trioza*, on the grounds that the separation by the pubescent or hirsute dorsum makes a very unnatural and wholly unsatisfactory division. According to my observations, however, the nymphs of this species are quite different in shape from those of the members of the genus *Trioza*, and the conditions of the marginal cells in the fore-wing, hirsute antennae, etc. of this adult are also different from those in the genus *Trioza*. Those differences convince me to make a distinction between these two genera, *Trichochermes* and *Trioza*.

27. *Trichochermes bicolor* KUWAYAMA

Trichochermes bicolor KUWAYAMA, Trans. Sapporo Nat. Hist. Soc., Vol. III, p. 54, Pl. II-Fig. 2, 8 (1910); OSHANIN, Katal. palaearkt. Hemipt., p. 128 (1912); AULMANN, Psyllid. Cat., p. 59 (1913); TAKAHASHI, Trans. Nat. Hist. Soc. Formosa, Vol. XVII, p. 153 (1927).

Trioza bicolor CRAWFORD, Phil. Jour. Sci., Vol. XV, p. 186 (1919); KUWAYAMA, Jr., Ins. World, Vol. XXVI, p. 372 (1922).

Habitat: Koshun (after TAKAHASHI).

Distribution: Taiwan; Kyushu, Honshu.

Food Plant: *Ilex Oldhami* [Aquiforiaceae].

Remarks: A few years ago T. UE kindly sent to me some specimens of this species reared on *Ilex Oldhami* at Yasaka, Province of Bungo, Kyushu.

28. *Trichochermes hyalina* KUWAYAMA

Trichochermes hyalina KUWAYAMA, Trans. Sapporo Nat. Hist. Soc., Vol. III, p. 55, Pl. II-Fig. 9 (1910); AULMANN, Psyllid. Cat., p. 59 (1913); CRAWFORD, Phil. Jour. Sci., Vol. XV, p. 189 (1919); KUWAYAMA, Jr., Ins. World, Vol. XXVI, p. 372 (1922).

Habitat: "Formosa" (after KUWAYAMA).

Distribution: Taiwan.

Genus 16: *Stenopsylla* KUWAYAMA

Stenopsylla KUWAYAMA, Trans. Sapporo Nat. Hist. Soc., Vol. III, p. 53 (1910); CRAW-

FORD, Phil. Jour. Sci., Vol. XV, p. 185, p. 203 (1919); CRAWFORD, Phil. Jour. Sci., Vol. XXVIII, p. 39 (1925).

29. *Stenopsylla nigricornis* KUWAYAMA

Stenopsylla nigricornis KUWAYAMA, Trans. Sapporo Nat. Hist. Soc., Vol. III, p. 54, Pl. II-Figs. 3, 10 (1910); OSHANIN, Katal. palaearkt. Hemipt., p. 128 (1912); AULMANN, Psyllid. Cat., p. 60 (1913); CRAWFORD, Phil. Jour. Sci., Vol. XV, p. 203 (1919); KUWAYAMA, Jr., Ins. World, Vol. XXVI, p. 373 (1922): CRAWFORD, Phil. Jour. Sci., Vol. XXVIII, p. 39 (1925).

Habitat: "Formosa" (after KUWAYAMA), Jitsugetsutan (XI, 1921, leg. R. TAKAHASHI).

Distribution: Taiwan; Kyushu, Honshu.

Food Plant: *Clerodendron trichotomum* [Verbenaceae].

Remarks: R. TAKAHASHI kindly sent to me the specimens taken on "Kusagi" (*Clerodendoron trichotomum*).

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摘　　要

臺灣産のキジラミ科昆蟲は既知の26種の外、本報文に於て2新種1未記錄種を追加し、合計29種を數へることが出來る。是等は4亞科16屬に隷するものであつて、その內1屬は新屬と認むべきものである。今、新屬、新種、未記錄種並に食餌植物の判明せる種類を記すこと次の如くである。

Leptynoptera sulfurea CRAWFORD　テリハボクノキジラミ
　テリハボク［オトギリサウ科］
Pauropsylla nigra CRAWFORD　マンゴウキジラミ（未記錄種、和名新稱）
　マンゴウ［ウルシ科］
Paurocephala bifasciata KUWAYAMA, Jr. (sp. nov.)　ケイヌビワキジラミ（新稱）
　ケイヌビワ［クハ科］
Paurocephala psylloptera CRAWFORD　クイワンクハキジラミ
　クハ［クハ科］
Togepsylla takahashii KUWAYAMA, Jr. (Gen. et sp. nov.)　トゲキジラミ（新稱）
　［食餌植物不明］
Mesohomotoma camphorae KUWAYAMA　クスキジラミ
　ヤマアサ（オホハマボウ）［アフヒ科］
　クスノキ［クスノキ科］
Mesohomotoma lineaticollis ENDERLEIN　ツタフキキジラミ
　オホボンデンクワ［アフヒ科］
Homotoma radiatum KUWAYAMA　ヒゲブトキジラミ
　イヌビワ［クハ科］
Macrohomotoma gladiatum KUWAYAMA　セダカキジラミ
　ガジュマル［クハ科］
Diaphorina citri KUWAYAMA　ミカンキジラミ
　ミカン、ゲッキツ［ヘンルウダ科］
Epipsylla albolineata KUWAYAMA　タテスヂキジラミ
　アコウクズマメ［マメ科］
Psylla coccinea KUWAYAMA　ベニキジラミ
　アケビ［アケビ科］
Trioza camphorae SASAKI　クストガリキジラミ
　クスノキ［クスノキ科］
Trichochermes bicolor KUWAYAMA　ネグロキジラミ
　ナナメノキ［モチノキ科］
Stenopsylla nigricornis KUWAYAMA　ヒゲブトトガリキジラミ
　ニガキ［クマツヅラ科］